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RADAR UNDER THE REVISED RULES OF THE ROAD

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LT Bruce L. Bromberg, USN

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RADAR UNDER THE REVISED RULES OF THE ROAD

A Thesis

Presented to

The Judge Advocate General's School, U. S. Army

The opinions and conclusions expressed herein are those of the individual student author, and do not necessarily represent the views of either the Judge Advocate General's School, U. S. Army, or any other governmental agency. References to this study should include the foregoing statement.

By

Lieutenant Bruce L. Bromberg, United States Navy

4th April, 1966

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SCOPE

A study of the obligations of vessels using radar, to determine the effect of the revised International Regulations for Preventing Collisions at sea upon them.

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The International Regulations for Preventing Collisions at Sea,[1] as revised by the International Conference on Safety of Life at Sea, London, 1960, came into effect on the 1st September, 1965. The most striking change from the previously effective Rules lies in the Annex, containing eight "recommendations on the use of radar information as an aid to avoiding collisions at sea". This paper's purpose is to consider the effect of these recommendations on the obligations of vessels using radar, taking up first the obligation to use radar in low visibility, then the extent to which it may be relied upon to excuse obligations otherwise binding, and finally the care and skill required in using radar in either case.

Neither the revised Rules nor the International Convention for the Safety of Life at Sea, 1960,[2] draughted by the same conference, require ships to be equipt with radar.[3] United States courts have

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1. These are commonly known as the Rules of the Road; they will be referred to simply as the Rules, or, when necessary to distinguish them from local rules, as the International Rules. They are, by Statute, made binding upon all public and private vessels of the United States, when navigating international waters. 77 Stat. 194 (1963), 33 U.S.C., ss. 1051 et seqq. (1965).

2. T. I. A. S. No. 5780 (effective 26th May, 1965).

3. Recommendation 45, in Annex B. to the conference's Final Act, is that the parties encourage installation of radar meeting a Schedule of Performance Standards set out therein. S. Doc., Ex. K, 87th Cong. 1st Sess., pp 259-62.

1. [illegible]

2. [illegible]

3. [illegible]

been urged, on the basis of The T. J. Hooper & Tow,[4] to hold vessels not so equipt to be unseaworthy; but none has done so.[5] Moreover, the Rules do not require a ship equipt with radar to use it. When to do so remains a matter of good seamanship, governed by Rule 29.[6]

It is settled law that to fail to use an available radar when proceeding in low visibility is to neglect a precaution required by the ordinary practice of seamen, and thus a fault under Rule 29. The Medford[7] is the leading case so holding. The Thomas M. Barry steamed into fog near George's Bank at eighteen knots; although she was equipt with radar and had qualified operators aboard, the radar was not turned on when approaching the fog-bank. Within minutes after entering it, she struck and sank the trawler Medford. The Barry was guilty of numerous faults; but the court held that her ". . . failure . . . to use her radar is the most serious and sinister aspect of these causes".[8]

On the 24th May, 1955, the Derrechief was standing into harbour at Portland, Maine, in a dense fog. She was equipt with radar,

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4. 60 F.2d 737 (2 Cir. 1932).

5. E.g., S.S. Portland Trader, 213 F. Supp. 352 (D. Ore. 1962); The Cap'n Bill, 160 F. Supp. 563 (D. Mass. 1958); Anglo-Saxon Petroleum Co. Ltd., vs. United States 88 F. Supp. 158 (D. Mass. 1950).

6. Rules 16 and 29 and the Annex to the Rules are found in Appendix A.

7. 65 F. Supp. 622 (E.D.N.Y. 1946).

8. Id. at 626.

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which was functioning, and indicated another vessel's presence. No plot was kept (a subject that will be dealt with later), but the other vessel was nevertheless assumed to be either inbound or at anchor; and, for reasons that are obscure, the radar was turned off about twenty minutes after the contact had been picked up. The contact was in fact the Burgan, which was outbound, and which collided with the Bergechief. In the resulting litigation, the Bergechief was held at fault for, among other things, turning off her radar while proceeding in fog.[9] The Esso Plymouth[10] is a similar case. Factory smoke blown across the River Thames obscured approaching traffic. For some time, it was obvious to those in charge of the Esso Plymouth, bound up-river, that they must pass through this smoke, but they did not turn on their radar, which would have shown any traffic hidden by it. This was held to have been a fault contributing to her collision with the down-bound Elblag.

Of course, restricted visibility requires radar to be used only if it is known, or ought to be known, to those in charge of the ship.

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9. The Bergechief - The Burgan, 274 F.2d 469 (2 Cir. 1960). This case was governed by the Navigation Rules, commonly called the Inland Rules, 30 Stat. 96 (1897) as amended, 33 U.S.C., ss. 154 et seqq. (1957). Article 29 of the Inland Rules is substantially the same as Rule 29 of the International Rules; cases involving the Inland Rules are therefore taken as authoritative, but will be indicated when cited. Cases involving the Great Lakes Rules, 28 Stat. 645 (1895) as amended, 33 U.S.C., ss. 241 et seqq. (1957), and the Western Rivers Rules, 26 Stat. 320 (1890) as amended, 33 U.S.C., ss. 301 et seqq. (1957), will be treated similarly.

10. [1955] 1 Lloyd's List L. R. 429 (Adm. Div.)

9. [illegible] 2 Lloyd's Rep 1, 6. 409 (Com. Ct.)

When the Haiti Victory left Dover early one morning in May, 1955, visibility was excellent. She had no reason to suspect patchy fog in the North Sea, across which she was bound, and on a dark night would be unlikely to see a fog-bank until she was upon it. In fact, her first indication was the fog-signal of the Duke of York, on a crossing course, nearby, but concealed by fog. By the time the Haiti Victory could determine the Duke of York's position and take avoiding action, collision was inevitable; the Haiti Victory was exonerated.[11]

One may, moreover, turn off one's radar in low visibility, if it appears to function improperly, or gives a picture that is of no use in conning one's ship. This happened as the Issac T. Mann was proceeding down Narragansett Bay. Visibility had been good when she left Providence, but when she reached Gould Island, she saw a fog-bank coming in from sea. Her radar was turned on, but, owing to false echos and interference, the scope was hard to read, and it was turned off. The Mann collided in the fog with the Esso Aruba; she was exonerated, the court holding that, in the circumstances, her master had discretion not to use radar.[12]

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11. The Duke of York - The Haiti Victory, 230 F.2d 139 (4 Cir. 1956), aff'd sub nom. British Transport Commission vs. United States, 354 U.S. 129 (1957).

12. The Esso Aruba, 94 F. Supp. 486 (D. Mass. 1950), aff'd 197 F.2d 422 (1 cir. 1952) (Inland Rules). In the Court of Appeals, the owners of the Esso Aruba unsuccessfully urged many faults against the Mann, but failure to use radar was not among them.

The Duke of York - The Haiti Victory,[13] discussed above, must be taken as holding that, if visibility is sufficient to detect other ships in time to avoid collision, failure to use radar is not a fault under Rule 29. The Waltham Victory[14] holds similarly. This case arose out of a collision in the Delaware River between a steamer and an unlighted, wrecked car-float. The night being dark and clear, the steamer's radar had been turned off. The court held that neither this, nor her failure to see the car-float in time to avoid it, was negligence. In The Lady Nelson,[15] a tug and tow had been picked up on radar, on which they appeared as one. At the same time the tug's lights were sighted; the tow was unlighted. Those in charge of the Lady Nelson did not thereafter watch the radar. The tug's lights indicated that she would clear, as she did; but the barge she was towing did not, and was not sighted in time for the Lady Nelson to avoid it. The Lady Nelson was held not to have been at fault for relying solely on visual observations.

The court in The Malden[16] held that failure to use radar on a clear night did not contribute to the Malden's collision with U.S.S. Gearing, without deciding whether it was negligent. This will always be true, so long as the other vessel displays proper lights; for if the radar equipt vessel keeps a proper look-out, she will see the

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13. 230 F.2d 139 (4 Cir. 1956).

14. 192 F. Supp. 663 (E.D. Pa. 1961).

15. 1954 Am. Mar. Cas. 1279 (S.D.N.Y. 1954).

16. 224 F. Supp. 705 (E.D. Va. 1963).

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11. [illegible]
12. [illegible]
13. [illegible]
14. [illegible]

other in time to avoid her, and if she does not keep a proper look-out, she ought to be condemned on this ground. In The Marine Leopard,[17] the court suggested that failure to plot radar observations may have contributed, because the risk of collision would have been more apparent; but it expressly declined to hold this failure a fault:

> While I hesitate to go so far as to hold that each vessel was at fault for failing to utilize the full potentials of its radar, I do believe that Snow and Linkiewicz's actions in this regard constituted poor seamanship.[18]

This language is, of course, an equivocation, for if the two masters were guilty of poor seamanship, their ships ought to have been condemned under Rule 29. But the court did not have to decide the point at all, as both ships were held liable for other faults.

The Southern and Eastern Districts of Texas have held that vessels equipt with radar must use it in good visibility. The Glenville[19] and The Willowpool[20] both arose out of collisions between ships and drilling platforms in the Gulf of Mexico, off the Louisiana coast. Both collisions happened on dark, clear nights. The only difference

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17. 152 F. Supp. 197 (N.D. Calif. 1957).

18. Id. at 206.

19. 210 F. Supp. 865 (S.D. Tex. 1962).

20. 214 F. Supp. 449 (S.D. Tex. 1963).

[illegible]

between the cases is that the Glenville's radar was turned off, while the Willowpool's was on, but the officer of the watch did not look at it. In both cases, the failure to use radar was held to be a serious fault. It is to be noted, however, that where these collisions took place, the large number of off-shore drilling rigs is an unusual hazard. New rigs are constantly built, and in fact the charts of neither the Glenville nor the Willowpool were up to date in showing them. It is apparent from the opinions in both cases that these circumstances influenced the courts.

In good visibility, a proper look-out can be expected to detect other ships, and other obstructions, assuming that these comply with the Rules regarding lights. Similarly, while a radar plot is useful in manoeuvring to avoid, visual observation is adequate to do so. Against this, one must keep in mind that excessive use of radar equipment wears out its components. The better view is considered to be to allow reliance upon visual observation, unless, owing to low visibility, it is ineffective.

The second preliminary note to Part C of the revised Rules refers to the Annex. This is appropriate because, as radar need be used only in low visibility, only then can any deficiency in the way in which it is used be charged as a fault. The Annex in fact amounts almost wholly

to a gloss on Rule 16, defining the relationship between radar and the obligations imposed by the Rule.

Rule 16(a)

> Every vessel, or seaplane when taxi-ing on the water, shall, in fog, mist, falling snow, heavy rainstorms or any other condition similarly restricting visibility, go at a moderate speed, having careful regard to the existing circumstances and conditions.

Under this Rule, radar raises the question, whether a vessel equipt with it may proceed at a speed that would otherwise be deemed immoderate. Under the previously effective Rule 16(a), which is unchanged by the revised Rules, it has consistently been held that she may not.

The Dergechief - The Burgan[21] has already been discussed;[22] in this case, the Burgan was held at fault for proceeding in fog at an immoderate speed, and it was further held that her use of radar could not excuse the fault. Wood v. United States[23] illustrates why this excuse is unacceptable. The Wilson Victory, making fifteen knots through heavy fog in the North Sea, with her radar operating on the relatively short range of four miles, struck and sank a vessel that had never appeared on her scope. Circumstantial evidence indicated that the vessel

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21. 274 F.2d 469 (2 Cir. 1960) (Inland Rules). Rule 16 (a) of the Inland Rules differs from its international counterpart only in some immaterial omissions.
22. Page 3, supra.
23. 125 F. Supp. 42, (S.D.N.Y. 1954).

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81. [illegible] (2 [illegible], [illegible]) [illegible] [illegible] [illegible]

was the Bucentaur,[24] which had left Lowestoft the previous morning, and was not again heard from. The Wilson Victory's speed was clearly excessive, and the court held that the use of radar would not excuse it.

Inept use of radar may raise doubt whether excessive speed would have been excused had the radar been used properly. The Antinous[25] makes it fairly clear that it would not. The Mathew Luckenbach[26] more heavily emphasises the ineptness. The court in this case expressly held the Mathew Luckenbach at fault for proceeding at an immoderate speed; rightly read, it rejected any excuse based on the use of radar on the ground that the use had been negligent, and thus it did not reach the question, whether effective use of radar would excuse the otherwise immoderate speed.

In The Southport,[27] the claimed excuse was rejected for the same reason as in The Mathew Luckenbach;[28] the court went on, however, to

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24. The Bucentaur, according to the court, was 105 ft. long, 21 ft. in beam, and 11 ft. in draught. Id. at 44.

25. 156 F. Supp. 414 (E.D. La. 1957), rev'd on other grounds, 259 F.2d 11 (5 Cir. 1958).

26. 215 F. Supp. 667 (S.D.N.Y. 1963) (Inland Rules).

27. [1949] 82 Lloyd's List L. R. 862 (Adm. Div.).

28. 215 F. Supp. 667 (S.D.N.Y. 1963) (Inland Rules).

suggest, in the following language, that it would in no case have accepted it:

> . . . while a vessel equipped with radar might escape blame for proceeding at a high speed in fog, she would quite probably be found to blame if a collision ensued for failing to keep a good look-out on her radar screen. In the present case I prefer to find the Southport to blame for initial speed and for retaining an excessive speed until she heard the whistle of the Finnborg.[29]

This language arguably holds that the Southport's speed could not have been excused by her radar; it can be said contra that, as the court held, "That those on board the Southport . . . made no proper use of their instrument,"[30] the point was not before it. Any question about a vessel's obligation under Rule 16(a) was put to rest by the Court of Appeals in The Prins Alexander,[31] holding that possession and use of radar does not excuse an otherwise immoderate speed in fog; this was affirmed by the House of Lords.[32] The Admiralty Division has repeatedly refused to let "the use of this equipment [to be] prayed in aid so far as to justify navigation that would otherwise be reckless".[33]

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29. [1949] 82 Lloyd's List L. R. 862, 871 (Adm. Div.).

30. Ibid.

31. [1954] 1 Lloyd's List L. R. 281 (ct. App.)

32. The Prins Alexander, [1955] 2 Lloyd's List L. R. 1 (H.L.).

33. The Chugan, [1955] 2 Lloyd's List 685, 695 (Adm. Div.); The Nora, [1956] 1 Lloyd's List L. R. 617 (Adm. Div.); The Miguel de Larrinaga [1956] 2 Lloyd's List L. R. 530 (Adm. Div.).

Recommendation (2) accepts the view of these cases, that a vessel using radar may not proceed in low visibility at a speed that would otherwise be immoderate. The provision that, "information obtained from the use of radar is one of the circumstances to be taken into account when determining moderate speed," might to taken to indicate the contrary; but the next sentence, which says, "In this regard it must be recognized that small vessels, small icebergs, and similar floating objects may not be detected by radar" (which is quite true), negatives this interpretation.

The last sentences of recommendation (2) goes further, to say, "Radar indications of one or more vessels in the vicinity may mean that 'moderate speed' should be slower than a mariner without radar might consider moderate in the circumstances." Even this interpretation has been anticipated. The fishing vessel Marsha Ann, standing out of San Pedro Bay, California, in heavy fog, picked up three vessels forward of her beam, and immediately stopt her engines. The vessels were tracked until they had closed to within two hundred yards, when they were lost in the sea return. Shortly afterward, another fishing vessel, the Pear, was sighted close aboard, and the two collided. The Marsha Ann was almost dead in the water at the time of the collision, but was nevertheless held solely at fault for merely stopping, and not reversing to take off all way, when she first picked up the Pear.

Her speed was therefore immoderate.[34] A similar view is suggested in The Anna Salen,[35] but it appears that in this case the ships' speeds were excessive anyway.

Chesapeake & O. Dy. Co. vs. Cleveland Tankers, Inc.[36] arose out of a three-way collision in the Detroit River, in heavy fog, involving two steamers and a car ferry. The Neal, one of the steamers, held the other two on her radar, and the court held her at fault for not checking her speed in order to avoid them.

RULE 16(b)

> A power-driven vessel hearing apparently forward of her beam, the fog-signal of a vessel the position of which is not ascertained, shall, so far as the circumstances of the case admit, stop her engines, and then navigate with caution until danger of collision is over.

Under this rule, the question is, whether radar information can sufficiently ascertain another vessel's position to relieve one of the obligation to stop engines upon hearing a fog-signal forward of the beam. This question, under the unchanged previous Rule, has

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34. Foraich vs. Anaich, 191 F.2d 392 (9 Cir. 1951) (Inland Rules).

35. [1954] 1 Lloyd's List L. R. 475 (Adm. Div.).

36. 121 F. Supp. 830 (E.D. Mich. 1954) (Great Lakes Rules).

been unsettled. Weyerhaeuser S.S. Co., vs. United States[37] had applied Rule 18[38] to a collision in dense fog, on the theory that, as each vessel held the other on radar, they were "in sight" of one another for the purpose of applying the Steering and Sailing Rules.[39] If this view be accepted, radar contact is a fortiori sufficient ascertainment for purposes of Rule 16(b).[40]

Other courts have taken the contrary view. The Hjelmaren, passing through the English Channel in fog, picked up a radar contact,

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37. 174 F. Supp. 663 (N.D. Calif. 1959).

38. The provisions of the Steering and Sailing Rules are not really material to this paper, but Rules 18, 19, 21, 22, 23, and 24, for what interest they may hold, are set out in Appendix B.

39. This is overruled by Rule 1(c)(ix) of the Revised Rules.

40. In Orient Steam Navigation Co. vs. United States, 231 F. Supp. 469 (S.D. Calif. 1964), the court found that "the authorities are not in agreement" on this point, citing Weyerhaeuser and Avondale Marine-Ways, Inc., vs. Tug Crescent Cities, 1960 Am. Mar. Cas. 1451 (E.D. La. 1960), aff'd per cur., sub nom. National Marine Service, Inc., vs. Avondale Marine Ways, Inc., 1961 Am. Mar. Cas. 1040 (5 Cir. 1961). The latter case cannot be said to hold contra Weyerhaeuser, for it does not appear whether the radar equipt tug at any time held the vessel she struck on her scope.

The court in Orient Steam Navigation found the point unnecessary to decide. This case arose out of a collision between U.S.S. Kearsarge and the Oriana. The Kearsarge claimed that her radar information relieved her of the duty to slow; but she did not hold the Oriana on the radar repeater on her bridge (why does not appear), and although the Oriana was being plotted below-decks in the Combat Information Centre, this information was not effectively passed to the Kearsarge's bridge.

97. [illegible] (C.C. [illegible], [illegible]).

98. The provisions of the Standing Order [illegible] not [illegible] [illegible], but [illegible], [illegible], [illegible],

which proved to be the Miguel de Larrinaga. As the ships closed, those aboard the Larrinaga heard the Hjelmaren's fog-signal; thinking it to have come from starboard, they came left, across the Hjelmaren's bows.[41] When the Hjelmaren's master made out, through the fog, the Larrinaga's loom, and before he could make out her head, he came right. The ships collided; to avoid doing so, the Hjelmaren would have had to come left (although it is doubtful that this manoeuvre would have succeeded). In the ensuing litigation, the court rejected the Hjelmaren's claim that, having tracked the Larrinaga on her radar, she was sufficiently aware of the Larrinaga's movements to justify her action; it held rather, that a course change is to be made only if the other ship's heading has been determined visually.[42]

The House of Lords, in The Prins Alexander,[43] allowed that continuous observation and plotting of a radar contact may ascertain its position for purposes of Rule 16(b); but in that case this had not been done. Other cases dealing with manoeuvres in fog, made before visual sighting and based on radar information, have suggested that

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41. They were wrong, and in any case ought not to have changed course without having sighted the other ship; but the Larrinaga's faults are not material for present purposes.

42. The Miguel de Larrinaga, [1952] 2 Lloyd's List L. R. 530 (Adm. Div.). The Chinook - The Dagmar Salen, [1951] 4 D.L.R. 1 (Sup. Ct. Can.), appears to reach a similar result, but the court's criticism of the way in which the radar was used leaves the holding in doubt.

43. [1955] 2 Lloyd's List L. R. 1 (H. L.).

such action might have been permissible had the information been greater; but the vessels have in each case been condemned.[44]

Recommendation (3) provides, ". . . the radar range and bearing alone do not constitute ascertainment of the position of the other vessel under Rule 16(b) . . ." One may infer that some greater amount of radar information would constitute sufficient ascertainment, but neither the recommendation nor anything else in the revised Rules says how much. This is really a part of the larger question of the degree of care and skill required of radar operators; this standard will be dealt with later. It is enough at this time to say that, if the standard is met, it appears that one may rely upon information obtained by means of radar to ascertain a vessel's position, and thus be relieved of the obligation to stop engines.

RULE 16(c)

> A power-driven vessel which detects the presence of another vessel forward of her beam before hearing her fog-signal or sighting her visually may take early and substantial action to avoid a close quarters situation but, if this cannot be avoided, she shall, so far as the circumstances of

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44. E.g., The Anna Salen, [1954] 1 Lloyd's List L. R. 475 (Adm. Div.); The Nora, [1956] 1 Lloyd's List L. R. 617 (Adm. Div.).

> the case admit, stop her engines in proper time to avoid collision and then navigate with caution until danger of collision is over.

No counterpart of this provision antedates the 1960 revision. The legality of the manoeuvre it authorises was put in doubt by Weyerhaeuser S.S. Co. vs. United States,[45] which held, in a meeting situation, that two vessels holding each other on radar were "in sight" of one another for the purpose of applying Rule 18. This view would not prevent a manoeuvre to avoid close quarters in a meeting situation, in which there is no holding-on vessel; but were it applied in a crossing or an overtaking situation, the "holding-on" vessel might well hesitate to manoeuvre, lest she be held to have violated Rule 21.

A manoeuvre to avoid close quarters would not necessarily be charged as a fault. First, the Steering and Sailing Rules do not necessarily apply even to vessels that can visually observe each other; there must be risk of collision.[46] Moreover, the view taken in Weyerhaeuser is misconceived, and it is to be hoped that other courts, in

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45. 174 F. Supp. 663 (N.D. Calif. 1959).

46. The Monticello, 17 How. (58 U.S.) 152 (1954); The Aurania, 29 Fed 98 (S.D. N.Y. 1886); The Banshee, 6 Asp. Cas. 221 (Ct. App. 1887); cf. The Dexter, 23 Wall. (90 U.S.) 69 (1874); The I. N. 231, 178 F.2d 243 (2 Cir. 1949). In any case, regardless of the "holding-on" vessel's manoeuvre, it is hard to conceive how a collision could come about unless one of the vessels later violated Rule 16(b), in low visibility, or else Rule 19 or Rule 24.

other cases, would not follow it. A giving-way vessel can prudently manoeuvre to avoid only if she can rely upon the holding-on vessel being aware of her obligations under Rule 21; and a holding on vessel can prudently comply with Rule 21 only if she can rely upon the giving-way vessel being aware of her obligations under Rules 22 and 23. As vessels are not required to carry radar, such awareness can be assumed only if the vessels are within visual sighting distance.

But the London Conference of 1960 did not leave mariners to the uncertainties of judicial interpretation. The ghost of Weyerhaeuser was thoroughly exorcised. The fourth preliminary note to Part C of the revised Rules says, "Rules 17 to 24 apply only to vessels in sight of one another"; and Rule 1(c)(ix), "vessels shall be deemed to be in sight of one another only when one can be observed visually from the other." Having thus overruled Weyerhaeuser, the revised Rules go on expressly to authorise manoeuvres to avoid a close quarters situation; for obviously, risk of collision is thus eliminated.

Radar, of course, is the only means by which one can detect "another vessel forward of /the/ . . . beam before hearing her fog-signal or sighting her visually . . . ." Recommendation (4) cautions, "When action has been taken under Rule 16(c) . . . , it is essential to make sure that such action is having the desired effect." This implies that one watch the other vessel on radar until she begins to open. How carefully one must watch her will be discussed below.

Recommendations (5) through (8) deal with considerations to be taken into account in choosing a manoeuvre under Rule 16(c). They simply spell out some of the precautions "required by the ordinary practice of seamen," which must be followed under Rule 29. Recommendations (5) and (7) provide that changes of course and speed should be substantial. This allows for greater error in estimating the other vessel's course and speed, and will make the change more readily apparent to her. In The Anna Salen,[47] several ten-degree course changes were held a contributing fault. It is also important to ensure that there is enough time for the manoeuvre to be effective. Recommendation (8) provides, "If a close quarters situation is imminent, the most prudent action may be to take all way off the vessel." Porcich vs. Ancich[48] and Chesapeake & O. Ry. Co. vs. Cleveland Tankers, Inc.,[49] discussed at pages 11 and 12, can be said to illustrate this situation.

Radar must, if available, be used in low visibility, and it may be relied upon to avoid the obligations otherwise imposed by Rule 16(b).

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47. [1954] 1 Lloyd's List L. R. 475 (Adm. Div.).

48. 191 F.2d 392 (9 Cir. 1951) (Inland Rules).

49. 121 F. Supp. 830 (E.D. Mich. 1954) (Great Lakes Rules).

Clearly, it must be used with adequate care and skill, and this must be defined. Recommendation (1) says, "Assumptions made on scanty information may be dangerous and should be avoided." This is obvious, incontrovertible, and less than helpful. As has been seen, Recommendation (3) says what does not constitute ascertainment, but not what does. As the revised Rules do not set up a clear standard for the use of radar, one must fall back on the cases.

It is not surprising to find that one must at least look at the radar scope.[50] The Australia Star[51] arose out of a collision between two merchantmen blacked out owing to wartime conditions. The Australia Star, picking up the Hindoo and her escort on radar, turned on her navigational lights. As the Hindoo did not do likewise, the Australia Star's master assumed she would keep clear, and asked for no further ranges and bearings. She did not, however. The Australia Star struck her port side, sinking her, and was held at fault for her master's negligence. In The Antinous,[52] the Argentina was held at fault, in

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50. The Washington, 241 F.2d 819 (4 Cir. 1957); The Letha C. Edwards, 219 F. Supp. 22 (E.D. La. 1963) (Western Rivers Rules).

51. 172 F.2d 472 (2 Cir. 1949).

52. 156 F. Supp. 414 (E.D. La. 1957), rev'd on other grounds, 259 F.2d 11 (5 Cir. 1958) (Inland Rules).

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30. The revolutions, 3rd F.Ed. Bur [2 cts. 1827], The Issues C. Vincent, [3rd F. Phil. Ed [2 cts. 1827] (Another Three Issues).

31. [1/2 I.A. 1st [2 Cts. 1830].

32. [4th F. Phil. Bur [2 cts. Ed. 1827], 2nd F. Ed Other Issues, [3d F.Ed [1 cts. 1827] (Twelve Kinds).

part, for improper use of radar, in that

> . . . it was observed only intermittently by the Pilot, who, with her officers, did not properly interpret, or correctly appraise the information which it provided.[53]

Intermittently observing a radar scope tells one only that an object solid enough to reflect electronic waves is at the indicated bearing and distance. If the contact is watched for a period of time, one can tell whether a close quarters situation is likely to develope; but only if it clearly will not can this information be relied upon. In order to use radar intelligently in manoeuvring a ship, one must plot the contact, either on the face of the scope or on a manoeuvring board,[54] at known time intervals. By means of diagrammes, one can then derive the contact's course and speed, the range and bearing of her closest point of approach and the time she will pass through it, and the effect of any contemplated manoeuvres by either ship.[55] Unless this is done, the radar equipment simply is not fully used.

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53. 156 F. Supp. 414, 418. See also Barge May - FB-219, 1961 Am. Mar. Cas. 558 (E.D. Va. 1961), in which the FB-219 was held at fault, "For using radar improperly and failing to interpret it correctly." 1961 Am. Mar. Cas. 558, 559.

54. Available from the U.S. Navy Oceanographic Office as H.O. 2665-10.

55. For an explanation of this technique and the principles upon which it is based, see U. S. Navy Oceanographic Office, Manoeuvering Board Manual, H.O. 217, and Dutton, Navigation and Piloting, Ch. XXXV. (ed. 1958).

The view that good seamanship requires the equipment fully to be used is supported by the cases. It has already been noted that, in The Marine Leopard,[56] the court expressed the view that a radar plot might have prevented collision, but declined to hold the failure to use radar a fault. The court in The Bornholm[57] similarly avoided the question. The Bornholm used her radar while proceeding through fog, but did not plot the tug Fort Moultrie, with whose tow the Bornholm collided. The Bornholm was not even equipt with manoeuvring boards on which to keep a plot, and it appears that her officers could not have kept one anyway. The court said that these deficiencies might well amount to negligence, but that, as this negligence did not contribute to the collision (which was caused solely by the Fort Moultrie's unlawful, radical manoeuvre), the question was not reached.

In The Sandefjord,[58] the court noted that had the Polarusoil been plotted aboard the Sandefjord, the two ships would probably have passed safely; it considered the Sandefjord's failure to do so improper use of radar. In the Bergechief - The Burgan,[59] the argument

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56. 152 F. Supp. 197 (N. D. Calif, 1957).

57. 279 F.2d 419 (4 Cir. 1960) (Inland Rules).

58. 236 F.2d 270 (2 Cir. 1956). The Sandefjord, which had maintained an immoderate speed in fog, conceded her fault throughout this litigation; she sought, unsuccessfully, to share the blame with the Polarusoil.

59. 274 F.2d 469 (2 Cir. 1960) (Inland Rules). The facts are discussed at page 3.

that failure to use radar in fog had not in fact contributed to the collision was rejected, because a plot would have shown that the ships were on collision courses, and if there had been doubt that there was time to make one, the Bergechief ought to have stopt long enough.

The Royalton,[60] if the court had more clearly analysed the issues before it, would have held that failure to keep a plot is a fault. The Royalton, bound down Lake Huron in fog, picked up the Monrovia on radar. The Monrovia was tracked, but no plot was kept. Notwithstanding several course changes by the Royalton, the ships continued to close, and at a range of five miles, the Monrovia's fog-signal was heard on the starboard bow, less than four points from ahead.[61] The Royalton tried to contact the Monrovia by radio-telephone, and, failing, put her engines on "slow". She also came left, as she had several times during the approach, and twice signalled a green-to-green passing. The Monrovia crossed the second of these signals; but the meaning of the cross-signal was unclear, for although the approach had started as a meeting situation, and the Royalton still so viewed it, the ships by this time were on crossing courses. In any case, the

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60. 312 F.2d 671 (6 Cir. 1963) (Great Lakes Rules).

61. Rule 15 of the Great Lakes Rules provides, "A steam vessel hearing apparently not more than four points from right ahead, the fog-signal of another vessel shall at once reduce her speed to bare steerageway. . . ." 28 Stat. 648 (1895), 33 U.S.C., s. 272 (1957).

Royalton sounded the danger signal, and backed with as much power as she could. The Monrovia came hard right, swinging out of the fog and into the Royalton's stem.

The Royalton was condemned for two faults. The first was her failure at once to "reduce her speed to bare steerageway;" to have slowed was not enough; she ought to have backed to reduce way. The second was her failure to back and take off all way when her first passing signal was not answered. The use she made of radar was considered as bearing on the first fault. In the court's view, slowing when she did might have satisfied Rule 15 of the Great Lakes Rules, "under normal conditions", but a large number of circumstances called for more caution than normal; among these were the Monrovia's presence on the radar scope, observation of which showed her to be on a dangerously close course, and the Royalton's failure to plot the contact.[62] It is suggested that this really is not appropriately considered as bearing on whether the Royalton, by slowing, adequately complied with Rule 15. The point is rather that a plot would have made the likelihood of collision more apparent, and the Royalton's manoeuvre to avoid more certain; the omission to keep one is more properly condemned under the General Prudential Rule.[63]

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62. 312 F. 2d 671, 674-5.

63. Rule 28 of the Great Lakes Rules, 28 Stat. 649 (1895), 33 U.S.C. s. 293 (1957).

The collision involved in The Mathew Luckenbuch[64] well illustrates the importance of plotting radar contacts. The Francisville was transiting Rhode Island Sound and Buzzard's Bay, in fog, bound for Boston; the Mathew Luckenbach was bound for Philadelphia through the same waters. The ships were on reciprocal courses on which they would have passed safely green-to-green. At eight and one-half miles distance, the Mathew Luckenbach picked up the Francisville;[65] she did not plot the contact, however, nor did she try to compute its course and speed.[66] As the Francisville appeared to be in the northern part of the normal shipping lanes, she was assumed to be on a course to the right of the lanes' axis, and to intend to pass red-to-red. When she continued to close,[67] the Mathew Luckenbach came five degrees right, "to give her more room", and slowed. In fact, this put her course across the Francisville's and brought her into the Francisville's starboard side. The Mathew Luckenbach was held at fault, among other things,

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64. 215 F. Supp. 667 (S.D.N.Y. 1963) (Inland Rules).

65. As the court reconstructs the approach, the contact must have been ahead, or fine on the starboard bow; but this does not appear in the opinion.

66. The Mathew Luckenbach's master and pilot claimed to have plotted the Francisville with grease-pencil on the scope, but the court refused to believe them; there was no claim that anyone made a vector analysis. 215 F. Supp. 667, 680.

67. She could hardly have been drawing left at a satisfactory rate!

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for not plotting the Francisville, for only by doing so could she have used her radar information intelligently. The plot would have shown that the ships were on reciprocal courses; in its absence, the Mathew Luckenbach made the erroneous assumption that brought her into collision.

In Orient Steam Navigation Co. vs. United States[68] the court went so far as to hold the Oriana at fault for using the relative-motion display of a radar capable of a true-motion display. It is suggested that this is unnecessarily extreme, for a relative plot can provide as much information, more accurately, albeit less conveniently. It is to be noted that the Oriana was further faulted for failing to keep even a scope-head plot of her relative display.

Based on these cases, it is suggested that radar contacts must be plotted if the equipment is to be used with adequate care and skill. Whether failure to do so is a fault within the rule in The Pennsylvania[69] divides, under the revised Rules, into three questions.

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68. 231 F. Supp. 469 (S.D. Calif. 1964).

69. 19 Wall. (86 U.S.) 125 (1873). The Rule, at p. 136:

> But when, as in this case, a ship at the time of a collision is in actual violation of a statutory rule intended to prevent collisions, it is no more than a reasonable presumption that the fault, if not the sole cause, was at least a contributory cause of the disaster. In such a case the burden rests upon the ship of showing not merely that her fault might not have been one of the causes, or that it probably was not, but that it could not have been.

[illegible]

[illegible]

[illegible]

First, the position of a contact that has not been plotted is not deemed to have been ascertained for purposes of Rule 16(b). One must therefore stop engines upon hearing her fog-signal forward of the beam, and failure to do so is clearly a statutory fault.

Second, Rule 16(c) authorises, but does not require, manoeuvres to avoid close quarters. Failure to undertake such manoeuvres could not be deemed a fault, even though, owing to careless use of radar, one were unaware that a close quarters situation was developing. But, as has been pointed out, if a manoeuvre is made, one must use one's radar to ensure its success. If the rate at which the contact broadens increases, the manoeuvre will succeed, and this can be monitored without keeping a plot. It is suggested, however, that the courts are likely to set a uniform standard, and require a plot; it will be hard to convince a court of the contrary if a collision has in fact resulted.

Having considered these special cases, the question remains of a radar equipt vessel proceeding in low visibility and using her radar with inadequate care and skill. The two courts that have considered whether the rule in The Pennsylvania applies to her neglect have reached opposite results. In The Ferrechief - The Burgan,[70] the Second Circuit held that it does; The Fourth Circuit, in The Fornholm,[71]

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70. 274 F.2d 469 (2 Cir. 1960) (Inland Rules).

71. 279 F.2d 419 (4 Cir. 1960) (Inland Rules).

hold that a ship is to be condemned for negligently using her radar only if this is shown to have contributed to the collision. It is suggested that the Second Circuit's position is the more sound. Radar and visual look-out both serve to detect other shipping, in order to avoid colliding with it; as their purposes are the same, so ought the consequences of their neglect. It is generally accepted that want of a proper look-out, or his negligence, is a fault within The Pennsylvania.[72] Such negligence is not a 'violation of a statutory rule intended to avoid collision;'[73] but two years before The

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72. The Sightseer VIII, 283 F.2d 611 (2 Cir. 1960) (Inland Rules); The Bergechief - The Durgan, 274 F.2d 469 (2 Cir. 1960) (Inland Rules); The Whitecastle, 167 F.2d 676 (5 Cir. 1948) (Inland Rules). The Fourth Circuit (which decided The Bornholm, supra, fn. 69) has held that The Pennsylvania does not apply to negligence with respect to look-outs. Anthony vs. International Paper Co., 1961 Am. Mar. Cas. 1890 (1961) (Inland Rules). But it nevertheless held such negligence "so grave a default as to give rise to a strong inference that it contributed to the accident and to impose upon the vessel a heavy burden to show by clear and convicing evidence that it did not so contribute". 1961 Am. Mar. Cas. 1890, 1899. Quaere the difference.

73. 19 Wall. (86 U. S.) 125, 136. It is a neglect of an ordinary precaution, albeit one specifically mentioned in Rule 29. The J.A. Cobb, 1960 Am. Mar. Cas. 2318 (2 Cir. 1960) (Inland Rules). Occasionally, however, it is called a statutory fault; e.g., The Whitecastle, 167 F.2d 676 (5 Cir. 1948) (Inland Rules).

Pennsylvania was decided, The Ariadne[74] had held:

> Every doubt as to the performance of the duty [look-out], and the effect of non-performance, should be resolved against the vessel sought to be inculpated until she vindicates herself by testimony conclusive to the contrary.[75]

A similarly rigourous presumption was applied, for the same fault, in The Northern Indiana.[76] It was generally accepted, after The Pennsylvania had been decided, that although an inadequate look-out violates no statutory Rule, it gives rise to the same presumption.[77] As a vessel must prove that a deficient look-out could not have contributed to a collision, similar proof ought to be required if she does not keep a radar plot, and thus fails to make full use of her equipment.

The revised Rules, for the first time, contain provisions dealing expressly with the obligations of radar equipt vessels; however, these obligations are not greatly changed from those under the previously

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74. 13 Wall. (80 U.S.) 475 (1871).

75. Id. at 479. Some cases have gone so far as to say this is true of any ordinary precaution; e.g., The Great Republic, 23 Wall. (90 U.S.) 20 (1874); The Schooner Lion, 1 Sprague 40 (D. Mass., 1843).

76. 3 Blatchf. 92 (2 Cir. 1853).

77. The Madison, 250 Fed. 850 (2 Cir. 1918) (Inland Rules); The George W. Roby, 111 Fed. 601 (6 Cir. 1901) (Great Lakes Rules); McCabe vs. Old Dominion S.S. Co., 31 Fed. 234 (D. Del. 1887).

[illegible]

[illegible]

[illegible]

effective Rules. The revised Rules require vessels neither to carry radar nor to use it; the decisions under the previous Rules still control these questions. The revised Rules have confirmed the view that use of radar does not excuse a speed otherwise immoderate under Rule 16(a), but this view was quite settled.

The most important of the provisions dealing with radar are recommendation (3), providing that radar information may ascertain a vessel's position for purposes of Rule 16(b), and Rule 16(c), authorising manoeuvres to avoid close quarters. Under the previous Rules, there was enough doubt on both questions that the clarification in the revised Rules is to be welcomed.

The revised Rules do little, however, to set a standard of care and skill to be met by those using radar. This is still governed, and it is suggested, for all practical purposes wholly governed, by the cases decided under the previous Rules, and that will be decided under the new.

APPENDIX A

Rule 16

(a) Every vessel, or seaplane when taxi-ing on the water, shall, in fog, mist, falling snow, heavy rainstorms or any other condition similarly restricting visibility, go at a moderate speed, having careful regard to the existing circumstances and conditions.

(b) A power-driven vessel hearing, apparently forward of her beam, the fog-signal of a vessel the position of which is not ascertained, shall, so far as the circumstances of the case admit, stop her engines, and then navigate with caution until danger of collision is over.

(c) A power-driven vessel which detect the presence of another vessel forward of her beam before hearing her fog signal or sighting her visually may take early and substantial action to avoid a close quarters situation but, if this cannot be avoided, she shall, so far as the circumstances of the case admit, stop her engines in proper time to avoid collision and then navigate with caution until danger of collision is over.

Rule 29

Nothing in these Rules shall exonerate any vessel, or the owner, master or crew thereof, from the consequences of any neglect to carry lights or signals, or of any neglect to keep a proper look-out, or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

Annex to the Rules

(1) Assumptions made on scanty information may be dangerous and should be avoided.

(2) A vessel navigating with the aid of radar in restricted visibility must, in compliance with Rule 16(a), go at a moderate speed. Information obtained from the use of radar is one of the circumstances

to be taken into account when determining moderate speed. In this regard it must be recognized that small vessels, small icebergs and similar floating objects may not be detected by radar. Radar indications of one or more vessels in the vicinity may mean that "moderate speed" should be slower than a mariner without radar might consider moderate in the circumstances.

(3) When navigating in restricted visibility the radar range and bearing alone do not constitute ascertainment of the position of the other vessel under Rule 16(b) sufficiently to relieve a vessel of the duty to stop her engines and navigate with caution when a fog signal is heard forward of the beam.

(4) When action has been taken under Rule 16(c) to avoid a close quarters situation, it is essential to make sure that such action is having the desired effect. Alterations of course or speed or both are matters as to which the mariner must be guided by the circumstances of the case.

(5) Alteration of course alone may be the most effective action to avoid close quarters provided that:--

(a) There is sufficient sea room.

(b) It is made in good time.

(c) It is substantial. A succession of small alterations of course should be avoided.

(d) It does not result in a close quarters situation with other vessels.

(6) The direction of an alteration of course is a matter in which the mariner must be guided by the circumstances of the case. An alteration to starboard, particularly when vessels are approaching apparently on opposite or nearly opposite courses, is generally preferable to an alteration to port.

(7) An alteration of speed, either alone or in conjunction with an alteration of course, should be substantial. A number of small alterations of speed should be avoided.

(8) If a close quarters situation is imminent, the most prudent action may be to take all way off the vessel.

Rule 18

(a) When two power-driven vessels are meeting end on, or nearly end on, so as to involve risk of collision, each shall alter her course to starboard, so that each may pass on the port side of the other. This Rule only applies to cases where vessels are meeting end on, or nearly end on, in such a manner as to involve risk of collision, and does not apply to two vessels which must, if both keep on their respective course, pass clear of each other. The only cases to which it does apply are when each of two vessels is end on, or nearly end on, to the other; in other words, to cases in which, by day, each vessel sees the masts of the other in a line, or nearly in a line, with her own; and by night, to cases in which each vessel is in such a position as to see both the sidelights of the other. It does not apply, by day, to cases in which a vessel sees another ahead crossing her own course; or, by night, to cases where the red light of one vessel is opposed to the red light of the other or where the green light of one vessel is opposed to the green light of the other or where a red light without a green light or a green light without a red light is seen ahead, or where both green and red lights are seen anywhere but ahead.

(b) For the purposes of this Rule and Rules 19 to 29 inclusive, except Rule 20(c) and Rule 28, a seaplane on the water shall be deemed to be a vessel, and the expression "power-driven vessel" shall be construed accordingly.

Rule 19

When two power-driven vessels are crossing, so as to invlove risk of collision, the vessel which has the other on her own starboard side shall keep out of the way of the other.

Rule 21

Where by any of these Rules one of the two vessels is to keep out of the way, the other shall keep her course and speed. When, from any cause, the latter vessel finds herself so close that collision cannot be avoided by the action of the giving-way vessel alone, she also shall take such action as will best aid to avert collision (see Rules 27 and 29).

Rule 11

(a) When two power-driven vessels are meeting end on, or nearly end on, so as to involve risk of collision, each shall alter her course to starboard, so that each may pass on the port side of the other. This rule only applies to cases in which vessels are meeting end on, or nearly end on, in such a manner as to involve risk of collision, and does not apply to two vessels which must, if both keep on their respective courses, pass clear of each other. The only cases to which it does apply are when each of two vessels is end on, or nearly end on, to the other; in other words, to cases in which, by day, each vessel sees the masts of the other in a line, or nearly in a line, with her own; and by night, to cases in which each is in such a position as to see both the side lights of the other. It does not apply, by day, to cases in which a vessel sees another ahead crossing her own course, or by night, to cases where the red light of one vessel is opposed to the red light of the other or where the green light of one vessel is opposed to the green light of the other or where a red light is seen without a green light or a green light without a red light, or where neither green nor red lights are seen, or in any doubtful circumstances.

(b) The fact that a vessel is not bound to keep out of the way to another vessel under Rule 21, 22, 23, or 24, shall not relieve her of the obligation of keeping out of the way of the other vessel when navigating in accordance with this rule.

Rule 12

If two power-driven vessels are crossing, so as to involve risk of collision, the vessel which has the other on her own starboard side shall keep out of the way of the other.

Rule 13

Every vessel overtaking any other shall keep out of the way of the vessel being overtaken. Every vessel coming up with another vessel from any direction more than 2 points abaft her beam, i.e., in such a position with reference to the vessel which she is overtaking that at night she would be unable to see either of that vessel's side lights, shall be deemed to be overtaking. When a vessel is in doubt as to whether she is overtaking another or not, she shall assume that she is overtaking and act accordingly.

Rule 22

Every vessel which is directed by these Rules to keep out of the way of another vessel shall, so far as possible, take positive early action to comply with this obligation, and shall, if the circumstances of the case admit, avoid crossing ahead of the other.

Rule 23

Every power-driven vessel which is directed by the Rules to keep out of the way of another vessel shall, on approaching her, if necessary, slacken her speed or stop or reverse.

Rule 24

(a) Notwithstanding anything contained in these Rules, every vessel overtaking any other shall keep out of the way of the overtaken vessel.

(b) Every vessel coming up with another vessel from any direction more than 22½ degrees (2 points) abaft her beam, i.e., in such a position, with reference to the vessel which she is overtaking, that at night she would be unable to see either of that vessels sidelights, shall be deemed to be an overtaking vessel; and no subsequent alteration of the bearing between the two vessels shall make the overtaking vessel a crossing vessel within the meaning of these Rules, or relieve her of the duty of keeping clear of the overtaken vessel until she is finally past and clear.

(c) If the overtaking vessel cannot determine with certainty whether she is forward of or abaft this direction from the other vessel, she shall assume that she is an overtaking vessel and keep out of the way.

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